

SEQUENCE LISTING

<110> Falco, S. Carl
Cahoon, Rebecca E.
Rafalski, J. Antoni

<120> Vitamin B Metabolism Proteins

<130> BB-1201

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<150> 60/096,342
<151> August 12, 1998

<160> 16

<170> Microsoft Office 97

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<213> Zea mays

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gagataccaa agatacctgc atatttcacg ggaactggag atttgacaac tgctctccta 720
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<211> 310
<212> PRT
<213> Zea mays

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1 5 10 15
Arg Val Leu Ser Ile Gln Ser His Thr Val Gln Gly Tyr Val Gly Asn
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Lys Ser Ala Val Phe Pro Leu Gln Leu Leu Gly Phe Asp Val Asp Pro
35 40 45
Ile Asn Ser Val Gln Phe Ser Asn His Thr Gly Tyr Pro Thr Phe Arg
50 55 60

Gly Gln Val Leu Asn Gly Lys Gln Leu Trp Asp Leu Ile Glu Gly Leu
 65 70 75 80
 Glu Glu Asn Gln Leu Leu His Tyr Thr His Leu Leu Thr Gly Tyr Ile
 85 90 95
 Gly Ser Val Ser Phe Leu Asp Thr Val Leu Gln Val Val Glu Lys Leu
 100 105 110
 Arg Ser Val Asn Pro Asp Leu Val Tyr Val Cys Asp Pro Val Leu Gly
 115 120 125
 Asp Glu Gly Lys Leu Tyr Val Pro Gln Glu Val Ile Ser Val Tyr Gln
 130 135 140
 Gln Lys Val Val Pro Val Ala Ser Met Leu Thr Pro Asn Gln Phe Glu
 145 150 155 160
 Val Glu Leu Leu Thr Gly Leu Arg Ile Thr Ser Glu Glu Asp Gly Leu
 165 170 175
 Thr Ala Cys Asn Thr Leu His Ser Ala Gly Pro Gln Lys Val Val Ile
 180 185 190
 Thr Ser Ala Leu Ile Glu Gly Lys Leu Leu Leu Ile Gly Ser His Lys
 195 200 205
 Lys Thr Glu Glu Gln Gln Pro Glu Gln Phe Lys Ile Glu Ile Pro Lys
 210 215 220
 Ile Pro Ala Tyr Phe Thr Gly Thr Gly Asp Leu Thr Thr Ala Leu Leu
 225 230 235 240
 Leu Gly Trp Ser Asn Lys Tyr Pro Asp Ser Leu Glu Lys Ala Ala Glu
 245 250 255
 Leu Ala Val Ser Ser Leu Gln Ala Leu Leu Lys Arg Thr Val Glu Asp
 260 265 270
 Tyr Lys Met Ala Gly Phe Asp Pro Ser Thr Ser Ser Leu Glu Ile Arg
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 Leu Ile Gln Ser Gln Asp Glu Ile Arg Asn Pro Thr Val Thr Cys Lys
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<210> 3
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 <213> Oryza sativa

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 cacgggcact ggagatttaa caactgccct tctactagga tggagtaata aataccctga 240
 taaccttgga gaggcgctg aactggcggg atccatttgc aaggcacccc taaggagaac 300
 tgtggaagac tataaaagac tgggtttgac cctccaacca acacctagag atccgcctgg 360
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 <212> PRT
 <213> Oryza sativa

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 20 25 30
 Leu Leu Ile Gly Ser His Lys Lys Ala Lys Glu Gln Pro Pro Glu Gln
 35 40 45
 Phe Lys Ile Glu Ile Pro Lys Ile Pro Ala Tyr Phe Thr Gly Thr Gly
 50 55 60
 Asp Leu Thr Thr Ala Leu Leu Leu Gly Trp Ser Asn Lys Tyr Pro Asp
 65 70 75 80
 Asn Leu Gly Glu Gly Ala Glu Leu Ala Val Ser Ile Cys Lys Ala Pro
 85 90 95
 Leu Arg Arg Thr Val Glu Asp Tyr Lys Arg Leu Gly Leu Thr Leu Gln
 100 105 110
 Pro Thr Pro Arg Asp Pro Pro Gly Phe Lys Thr Lys Asp Glu Xaa Xaa
 115 120 125
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 <211> 812

10081301.022002

<212> DNA
<213> Glycine max

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20222010643001

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aggggtatgt tggtaataaa tccgctgtct tccctctgca actactggga tatgatgtcg 180
atccaattaa tctcgtgcag ttttogaatc atacaggata tccgacgttt aagggtcagg 240
ttttgaatgg acagcaactc tgggatctaa tcgaaggcct tgaaggaat gattttattgt 300
tctatactca ctgtctaaca ggttatatgt gttcagagtc ttttctaaac actgtattgc 360
aagtgttcag caaacttcgg tcaacaaacc caggtctctc gtatgtatgt gatccagtga 420
tgggtgatga aggaaagctt tatgttcctc aaggactagt atcagtctat cgtgagaagg 480
ttgttcagtg agcttcaatg ttgactccca accagtttga agcagaacta ctgacaggct 540
ttaggattca gtctgaagga catggccggg aggcgtntag gcttctccat gcagctgggc 600
cttcaaaagn cataattaca agtataata tagacgggat tcttctcctc attggcagtc 660
atccaaaga aaaggagag ccnccngac aatttaagat tgttattcca aaaataacca 720
gcttatttta cgggaacggg ananncatg actgnattcn tcttggttng agcataanta 780
cccannacaa ancttgagaa tgcngcggaa ct 812

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<211> 196
<212> PRT
<213> Glycine max

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<222> (178)

<220>
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Val Leu Ser Ile Gln Ser His Thr Val Gln Gly Tyr Val Gly Asn Lys
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Ser Ala Val Phe Pro Leu Gln Leu Leu Gly Tyr Asp Val Asp Pro Ile
35 40 45
Asn Ser Val Gln Phe Ser Asn His Thr Gly Tyr Pro Thr Phe Lys Gly
50 55 60
Gln Val Leu Asn Gly Gln Gln Leu Trp Asp Leu Ile Glu Gly Leu Glu
65 70 75 80
Gly Asn Asp Leu Leu Phe Tyr Thr His Leu Leu Thr Gly Tyr Ile Gly
85 90 95
Ser Glu Ser Phe Leu Asn Thr Val Leu Gln Val Val Ser Lys Leu Arg
100 105 110
Ser Thr Asn Pro Gly Leu Ser Tyr Val Cys Asp Pro Val Met Gly Asp
115 120 125
Glu Gly Lys Leu Tyr Val Pro Gln Glu Leu Val Ser Val Tyr Arg Glu
130 135 140
Lys Val Val Pro Val Ala Ser Met Leu Thr Pro Asn Gln Phe Glu Ala
145 150 155 160

Glu Leu Leu Thr Gly Phe Arg Ile Gln Ser Glu Gly His Gly Arg Glu
165 170 175

Ala Xaa Arg Leu Leu His Ala Ala Gly Pro Ser Lys Xaa Ile Ile Thr
180 185 190

Ser Ile Asn Ile
195

<210> 7
<211> 773
<212> DNA
<213> Triticum aestivum

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ctctctggct ttgatgtgga tccaataaac tctgtacagt tttctaatac tacaggatac 180
ccaacattta gagggtcagt tcttaatggc aaacagctct gggaacttat tgaaggactg 240
gaggaaaatc agctgcttca ttatacccat ttattaacag gttatatagg ctacgtttcc 300
tttttagata ctgtgctaca agttgttgag aaattgcgat cagttaatcc tgatcttgta 360
tctgtttatc aacagaagggt tgttccagtt gcttcaatgc ttacacctaa ccaattgaa 480
gttgaaactac ttactgattg gaggatcacc tccgaagaag atggtttgac agcttgtaat 540
accctccaca gtgccggacc acagaagggt gttataacta gtgctcttat tgaaggtaag 600
ctgctcctta tcggaaagta caaaaaaaca gaggaacaac agccagaaca atttaagatt 660
gagataccaa agatacctgc atatttcacg ggaactggag atttgacaac tgccttccta 720
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<210> 8
<211> 256
<212> PRT
<213> Triticum aestivum

<400> 8
Met Ala Arg Pro Pro Ile Leu Ser Val Ala Leu Pro Ser Asp Thr Gly
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Arg Val Leu Ser Ile Gln Ser His Thr Val Gln Gly Tyr Val Gly Asn
20 25 30

Lys Ser Ala Val Phe Pro Leu Gln Leu Leu Gly Phe Asp Val Asp Pro
35 40 45

Ile Asn Ser Val Gln Phe Ser Asn His Thr Gly Tyr Pro Thr Phe Arg
50 55 60

Gly Ser Val Leu Asn Gly Lys Gln Leu Trp Glu Leu Ile Glu Gly Leu
65 70 75 80

Glu Glu Asn Gln Leu Leu His Tyr Thr His Leu Leu Thr Gly Tyr Ile
85 90 95

Gly Ser Val Ser Phe Leu Asp Thr Val Leu Gln Val Val Glu Lys Leu
100 105 110

Arg Ser Val Asn Pro Asp Leu Val Tyr Val Cys Asp Pro Val Leu Gly
115 120 125

10081301.022002

Asp Glu Gly Lys Leu Tyr Val Pro Gln Glu Leu Ile Ser Val Tyr Gln
 130 135 140
 Gln Lys Val Val Pro Val Ala Ser Met Leu Thr Pro Asn Gln Phe Glu
 145 150 155 160
 Val Glu Leu Leu Thr Gly Leu Arg Ile Thr Ser Glu Glu Asp Gly Leu
 165 170 175
 Thr Ala Cys Asn Thr Leu His Ser Ala Gly Pro Gln Lys Val Val Ile
 180 185 190
 Thr Ser Ala Leu Ile Glu Gly Lys Leu Leu Leu Ile Gly Ser His Lys
 195 200 205
 Lys Thr Glu Glu Gln Gln Pro Glu Gln Phe Lys Ile Glu Ile Pro Lys
 210 215 220
 Ile Pro Ala Tyr Phe Thr Gly Thr Gly Asp Leu Thr Thr Ala Leu Leu
 225 230 235 240
 Leu Gly Trp Ser Asn Lys Tyr Pro Asp Ile Leu Glu Gly Gly Tyr Gln
 245 250 255

<210> 9
 <211> 828
 <212> DNA
 <213> Zea mays

<220>
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 tcctttaccc tgggcacatc aatgtgtgtg agaattggaa aagctccatc tgttgaaatt 180
 tcactctcca gggagaacta tatttccctt gaactctctg agagtcagat gatgtctgat 240
 ccatttgatc agttccttaa atgggtttgat gaagcagtaa cagccggtcc cggtctgcgt 300
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 gttcttttaa agggagttga taaacaggga tttgtttggt atacaaatta tggtagccgg 420
 aaggcgcatg acttgtgtga aaaccctaac gcagcactcc ttttctactg gaatgagatg 480
 aaccgtcagg taagagttga agggtcagtt gagaaggttc cagaagctga atcagataaa 540
 tatttccaca gccgccacg tgggaagtcag cttggtgcca tagtcagcaa gcagagtact 600
 gtaattgctg gaagagaagt tcttcaacag gattacaaga aattggaaca aaaatattct 660
 tggggagctg tgattccaaa acctgaatat tgggggtggc acaaatgac accgacactt 720
 tttagttct ggcaaggaca acagtcctga ctgcatgacc gggtacaata ctcgcagaga 780
 gaagtatgat ggagcacagt gtggcacatc gagagggtgt ccccttga 828

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 <213> Zea mays

<220>
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 Gly Pro His His Phe Leu Gly Gly Xaa Phe Val Pro Pro Pro Ile Leu
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 Asn Gln Leu Arg Asp Phe Ser Ser Ser Phe Thr Leu Gly Thr Ser Met
 35 40 45
 Cys Val Arg Ile Gly Lys Ala Pro Ser Val Glu Ile Ser Ser Leu Arg
 50 55 60
 Glu Asn Tyr Ile Ser Pro Glu Leu Leu Glu Ser Gln Val Met Ser Asp
 65 70 75 80
 Pro Phe Asp Gln Phe Leu Lys Trp Phe Asp Glu Ala Val Thr Ala Gly
 85 90 95
 Pro Gly Leu Arg Glu Pro Asn Ala Met Ala Leu Thr Thr Ala Asn Lys
 100 105 110
 Glu Gly Lys Pro Ser Ser Arg Met Val Leu Leu Lys Gly Val Asp Lys
 115 120 125
 Gln Gly Phe Val Trp Tyr Thr Asn Tyr Gly Ser Arg Lys Ala His Asp
 130 135 140
 Leu Cys Glu Asn Pro Asn Ala Ala Leu Leu Phe Tyr Trp Asn Glu Met
 145 150 155 160
 Asn Arg Gln Val Arg Val Glu Gly Ser Val Glu Lys Val Pro Glu Ala
 165 170 175
 Glu Ser Asp Lys Tyr Phe His Ser Arg Pro Arg Gly Ser Gln Leu Gly
 180 185 190
 Ala Ile Val Ser Lys Gln Ser Thr Val Ile Ala Gly Arg Glu Val Leu
 195 200 205
 Gln Gln Asp Tyr Lys Lys Leu Glu Gln Lys Tyr Ser Asp Gly Ser Leu
 210 215 220
 Ile Pro Lys Pro Glu Tyr Trp Gly Gly Tyr Lys Leu Thr Pro Thr Leu
 225 230 235 240
 Phe Glu Phe Trp Gln Gly Gln Gln Ser Arg Leu His Asp Arg Leu Gln
 245 250 255
 Tyr Ser Gln Arg Glu Val Asp Gly Ser Thr Val Trp His Ile Glu Arg
 260 265 270
 Leu Ser Pro
 275
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 <213> Oryza sativa

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 coatatcccg gtacctcaat gtgtgtgaga attggaaaag ctccatctgt tgacatttca 180
 tctctaagaa gaaattacat ctccctgaa ctctcgaagn aacaggtgat gctgatcca 240
 tttgataant tcgttagatg gtttgatgaa ctgttacgct ggctacgtga accaaatgct 300
 atggttaaca actccgataa ggagggaaaaa ctctgcaaaag aatggccttt aangngttg 360
 ataaccacgg attttttggg ancaattntg ganccaaaaa gacatgatta cctgaaaacca 420
 aatgcngccn gttncantgg aaggaataac ggcagtaaaa taaagtctgt canangtcca 480
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 ctganggant ncagg 555

<210> 12
 <211> 110
 <212> PRT
 <213> Oryza sativa

<220>
 <221> UNSURE
 <222> (74)

<220>
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 <222> (83)

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Gly Pro His His Phe Leu Gly Gly Arg Phe Val Pro Pro Pro Ile Val
 20 25 30

Ser Lys Tyr Lys Leu His Leu Pro Pro Tyr Pro Gly Thr Ser Met Cys
35 40 45

Val Arg Ile Gly Lys Ala Pro Ser Val Asp Ile Ser Ser Leu Arg Arg
50 55 60

Asn Tyr Ile Ser Pro Glu Leu Leu Glu Xaa Gln Val Met Pro Asp Pro
65 70 75 80

Phe Asp Xaa Phe Val Arg Trp Phe Asp Glu Leu Leu Arg Trp Leu Arg
85 90 95

Glu Pro Asn Ala Met Val Asn Asn Ser Asp Lys Glu Gly Lys
100 105 110

<210> 13
<211> 864
<212> DNA
<213> Glycine max

<400> 13
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ttgtcccccac ctgctattgc agaaaaatat aagctttatc ttccaccata tcttggaact 180
tccatgtgtg ttccaattgg aaggcctcca cgtattgata tctcagctct aagagagaac 240
tatactcttc cagaatttct tgaagagcag gtggaggctg acccttttaa tcagtttcat 300
aaatggttta atgatgcatt ggctgctggt ttgaaggaac caaatgctat gtccttgcata 360
actgtaggga aggacgaaaa accctcatca agaattggtat tgctaaaagg ctgggataag 420
gaagagattg tgtggtacac aaactatgaa agtcgaaagg ccagtgaaat atctgaaaaat 480
ccacgtgcac cacttctttt ttactgggat ggtttaaacc ggcaggtacg ggtggaagg 540
cctgttcaga aagtctctga tgaggaatca gaacagtatt tccatagccg cctagagagt 600
agtcagattg gagcaatagt cagcaagcag agtactgtag tgccgggtag gcatgttctt 660
tatcaggagt acaagagact ggaagaaaaa tactctgatg gaagttaaat ccctaaacct 720
aagaactggg gtggatatag gctaaccacca caacttttgc agttttggca agggcgaaaa 780
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aagggtgacc ggttggtctc ttga 864

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<211> 287
<212> PRT
<213> Glycine max

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Leu Val Ser Leu Thr Ala Pro Arg Leu Gly Ala Lys Lys Phe Gly Gly
20 25 30

Pro His His Phe Leu Gly Gly Arg Phe Val Pro Pro Ala Ile Ala Glu
35 40 45

Lys Tyr Lys Leu Ile Leu Pro Pro Tyr Pro Gly Thr Ser Met Cys Val
50 55 60

Arg Ile Gly Arg Pro Pro Arg Ile Asp Ile Ser Ala Leu Arg Glu Asn
65 70 75 80

Tyr Ile Ser Pro Glu Phe Leu Glu Glu Gln Val Glu Ala Asp Pro Phe
85 90 95

Asn Gln Phe His Lys Trp Phe Asn Asp Ala Leu Ala Ala Gly Leu Lys
 100 105 110
 Glu Pro Asn Ala Met Ser Leu Ser Thr Val Gly Lys Asp Gly Lys Pro
 115 120 125
 Ser Ser Arg Met Val Leu Leu Lys Gly Leu Asp Lys Glu Gly Phe Val
 130 135 140
 Trp Tyr Thr Asn Tyr Glu Ser Arg Lys Ala Arg Glu Leu Ser Glu Asn
 145 150 155 160
 Pro Arg Ala Ser Leu Leu Phe Tyr Trp Asp Gly Leu Asn Arg Gln Val
 165 170 175
 Arg Val Glu Gly Pro Val Gln Lys Val Ser Asp Glu Glu Ser Glu Gln
 180 185 190
 Tyr Phe His Ser Arg Pro Arg Gly Ser Gln Ile Gly Ala Ile Val Ser
 195 200 205
 Lys Gln Ser Thr Val Val Pro Gly Arg His Val Leu Tyr Gln Glu Tyr
 210 215 220
 Lys Glu Leu Glu Glu Lys Tyr Ser Asp Gly Ser Leu Ile Pro Lys Pro
 225 230 235 240
 Lys Asn Trp Gly Gly Tyr Arg Leu Thr Pro Gln Leu Phe Glu Phe Trp
 245 250 255
 Gln Gly Gln Lys Ser Arg Leu His Asp Arg Leu Gln Tyr Thr Pro His
 260 265 270
 Glu Ile Asn Gly Gln Arg Leu Trp Lys Val Asp Arg Leu Ala Pro
 275 280 285

<210> 15
 <211> 456
 <212> DNA
 <213> Triticum aestivum

<400> 15
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 ttatcggaata attcaaatgc ggcacttctt ttctactgga atgagatgaa cgcacaggtt 120
 agagtagaag ggtcggttca gaaggtctca gaagaagaat ctgagaagta tttccacagc 180
 cgcccacgtg gaagtcagct tgggtcaatt gttagcaagc agagcactgt catttcttga 240
 agagaagtgc tccaacaagc gtacaaggaa ttggagcaaa aatattctga cggtagcttc 300
 atcccaaac ccgattactg ggggtggctac aagttgacac caaatctttt tgagttcttg 360
 caaggccagc agtctcgtct gcatgaccgg ctacagtatt cacagcgaga attaggtggg 420
 agtacagaat ggcacatcca aaggttgtcc ccttga 456

<210> 16
 <211> 150
 <212> PRT
 <213> Triticum aestivum

<400> 16
 His Glu Asp Lys Gln Gly Phe Val Trp Tyr Thr Asn Tyr Gly Ser Gln
 1 5 10 15

